



# A demonstration of "Visual Terminal"

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May 26, 2006

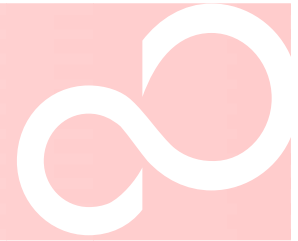
Fujitsu Limited,  
Fujitsu Laboratories Ltd,  
Fujitsu Software Technologies Limited

Jyunji Kondo ( Fujitsu Software Technologies Limited )



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# Agenda



- Introduction of “.u Visual” with demonstrations
  - Triple play + 1
    - Visual Communication
    - Visual AV Player
    - Visual Internet
    - 1-segment/3-segment Broadcasting Receiver
- Key Technologies
  - WideStudio/MWT
  - Reducing Startup time



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# .u Visual – Ubiquitous Visual Terminal

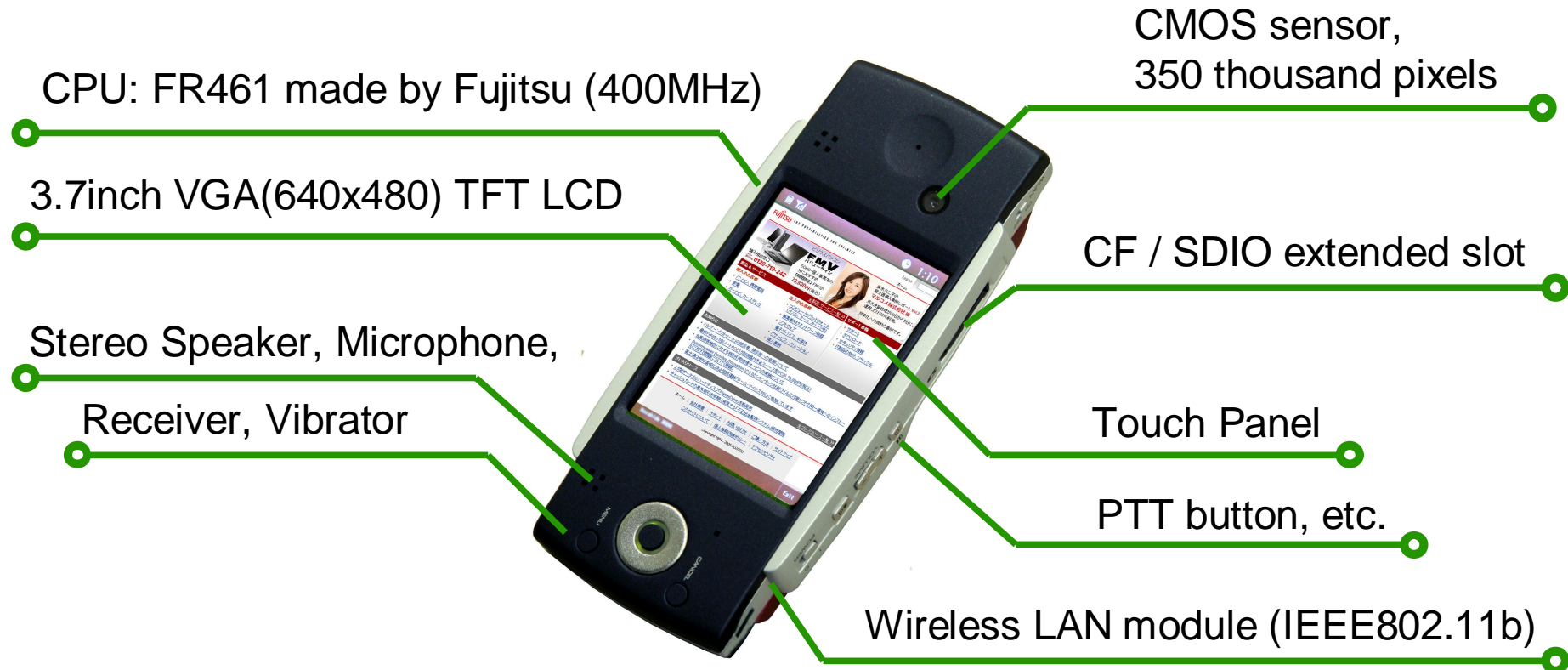
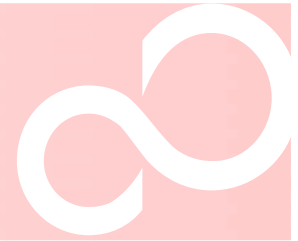
- Visual Communication
  - VoIP with Video / Push to talk with Video
  - MPEG-4 VGA 15fps G.729a/G.711
- Visual AV Player
  - Audio Video Player
  - MPEG-4 VGA 15fps AAC/MP3/WMA
- Visual Internet
  - Full Web Browser “Inspirium” by Fujitsu
- + 1-segment/3-segment Broadcasting Receiver



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# Hardware Configuration



And much more...

- Extended module I/F: 1-segment / 3-segment Broadcasting Tuner
- 3-axis acceleration sensor

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# Hardware Specifications



Items	Specification
Size / Weight	165 x 73 x 26[mm] / 245[gram]
CPU	FR461 made by Fujitsu (400MHz, 8 parallel instructions per cycle)
Memory	<ul style="list-style-type: none"><li>• SDRAM: 128MB</li><li>• NOR Flash ROM: 64MB</li></ul>
Expression	<ul style="list-style-type: none"><li>• 3.7inch VGA(640x480) TFT Color LCD</li><li>• Touch Panel</li></ul>
Pickup device	CMOS sensor, 350 thousand pixels
Wireless LAN	Wireless LAN module (IEEE802.11b compliant) embedded
Extended Module	1-segment / 3-segment Broadcasting Tuner
Sensor	3-axis acceleration sensor
External I/F	CF, SDIO, USB (when cradle is used)



# Software Specifications



Items	Specifications
OS	Embedded Linux 2.6 for FR-V
GUI environment	<ul style="list-style-type: none"><li>• X-Window System</li><li>• WideStudio/MWT</li></ul>
Middlewares	<ul style="list-style-type: none"><li>• MPEG-4 codec</li><li>• AAC codec</li><li>• AVC/H.264 dec</li></ul>
Applications	<ul style="list-style-type: none"><li>• Wireless IP video phone</li><li>• Wireless IP video transceiver</li><li>• AV Player</li><li>• Full Browser (Inspirium)</li><li>• 1-segment / 3-segment Broadcasting Receiver</li></ul>

# Visual Communication



- Video codecs
  - MPEG-4 QVGA 15FPS full-duplex
  - QVGA Portrait
- Audio codecs
  - G.729a/G.711 384kbps
- Communication Network
  - Wireless LAN(IEEE802.11b)

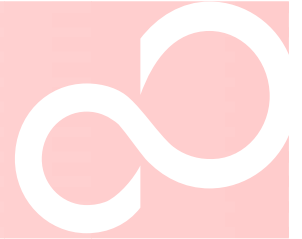


Only using software codecs!

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# Visual AV Player



- Video codecs
  - MPEG-4 SP VGA 15FPS
- Audio codecs
  - MPEG-4/2 AAC-LC



Only using software codecs!

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# Visual Internet



- Support Languages
  - HTML4.01 XHTML1.0, XHTML Basic
- Style Sheet
  - CSS1/2
- JavaScript1.5
- Protocols
  - HTTP1.0/1.1
- Software Keyboard



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# 1,3-segment Broadcasting Receiver

- Video codecs
  - AVC/H.264
- Audio codecs
  - MPEG-4 AAC LC
- BML supported

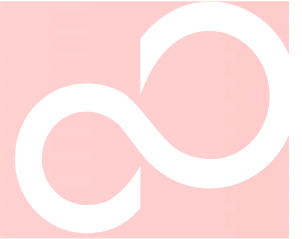


Only using software codecs!

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# Key Technologies

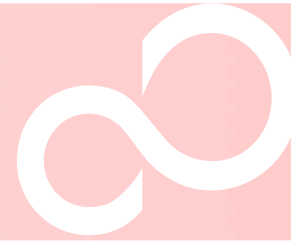


- WideStudio/MWT
- Reducing Startup time



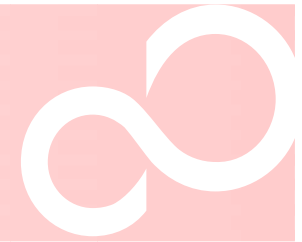
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# WideStudio/MWT(1)



- MWT stands for “Multi-platform Widget Toolkit”.
- Light weight GUI toolkit for embedded devices.
- High level portability using C/C++ languages.
- Main toolkit of NAB Subproject of Eclipse-DSDP
  - DSDP: Device Software Development Platform
  - NAB: Native Application Builder

# WideStudio/MWT(2)



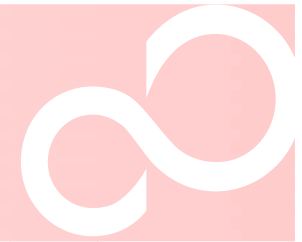
The web page of WideStudio project



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# WideStudio/MWT(3)



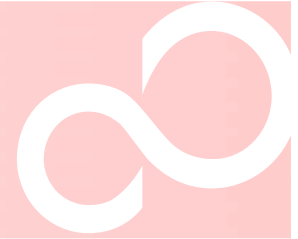
## The web page of Eclipse DSDP-NAB

The screenshot shows the Eclipse DSDP-NAB website. The header includes the Eclipse logo and a search bar. The navigation bar has links for Home, Community, Membership, Downloads, Projects, and About Us. The main content area is titled 'DSDP-NAB (eWideStudio) ホームページ' and features a 'Mission Statement' section. The mission statement describes the Native Application Builder (NAB) project, which aims to create GUI applications for various platforms using C++ and other languages. It also lists 'Quick Links' for downloading, project proposals, and a mailing list. An 'Events' section mentions a short talk at EclipseCon 2006. The footer contains copyright information for The Eclipse Foundation, 2006.



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# Reducing Startup time



- A case study of reducing startup time when migrating from 2.4 kernel to 2.6.

Step1: Data Collection

Step2: Analysis

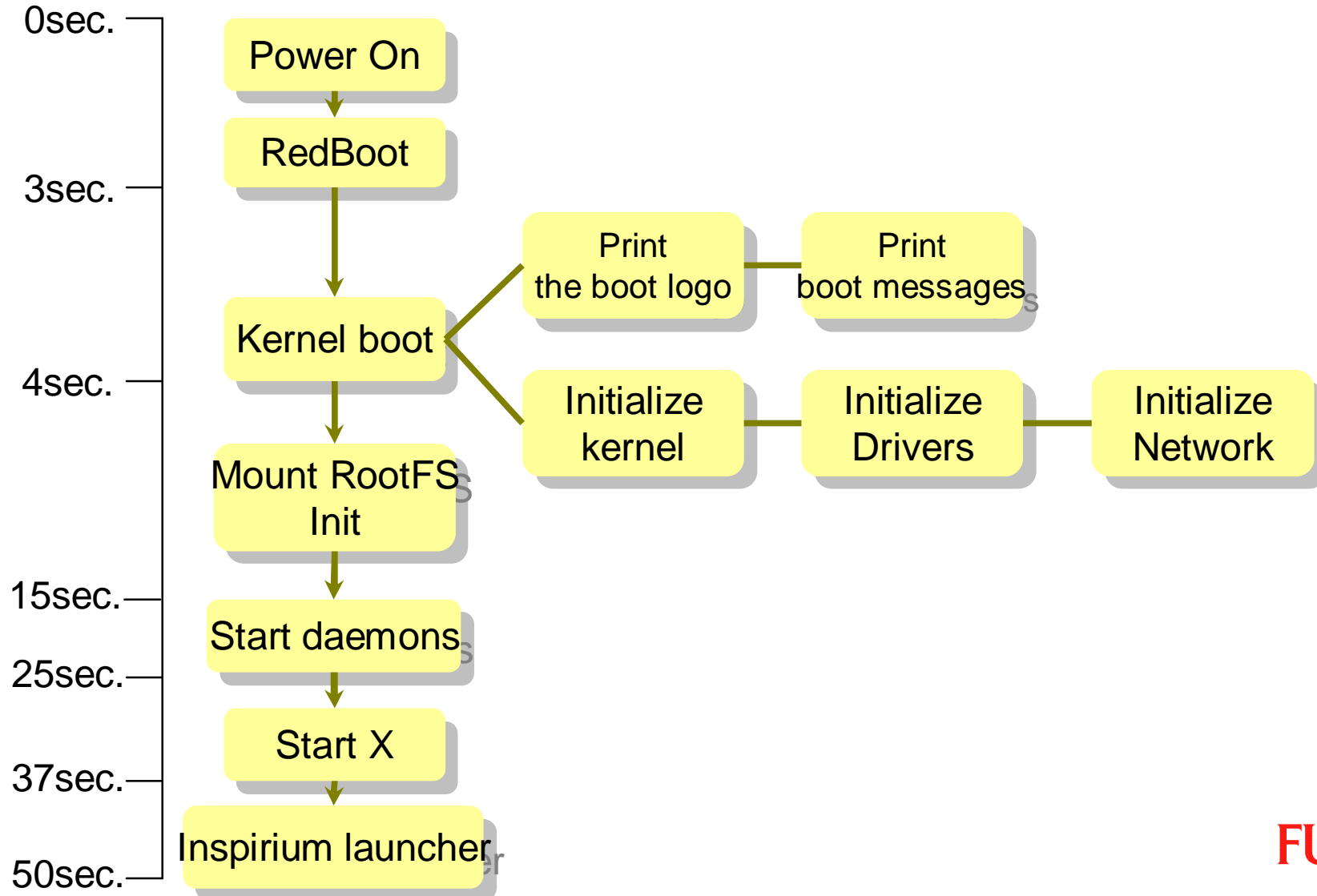
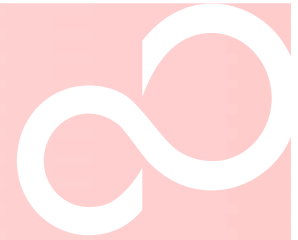
Step3: Refinement

Step4: Evaluation

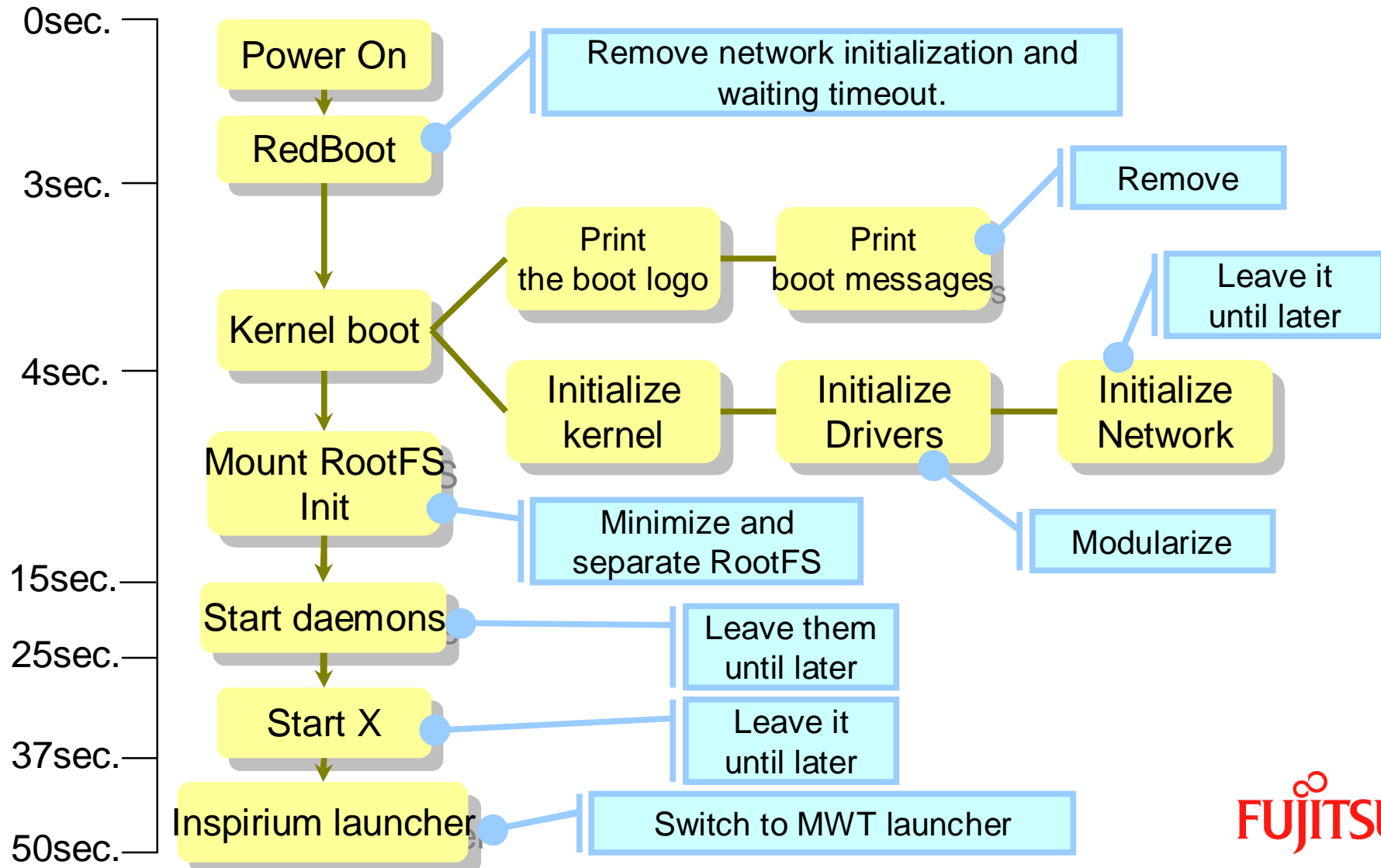
- <http://tree.celinuxforum.org/pubwiki/moin.cgi/BootChart>



# Step2: Analysis



# Step3: Refinement



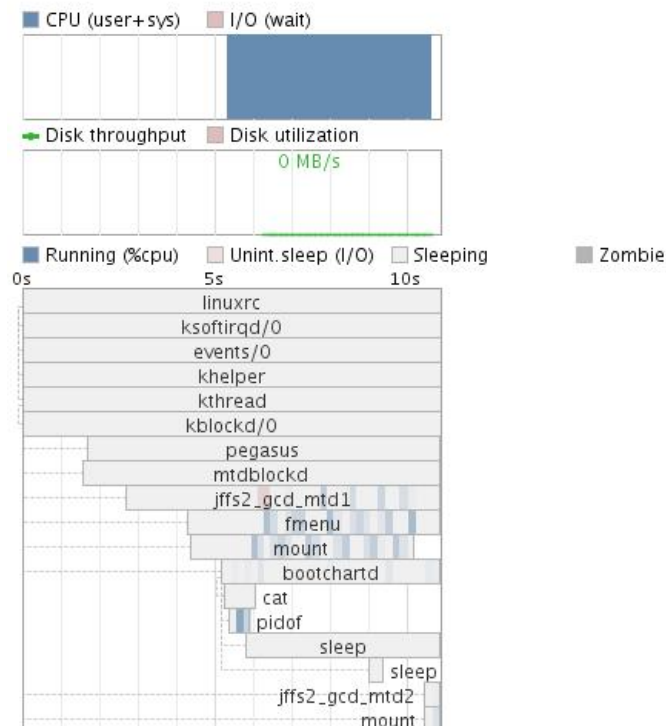
# Step4: Evaluation(1)



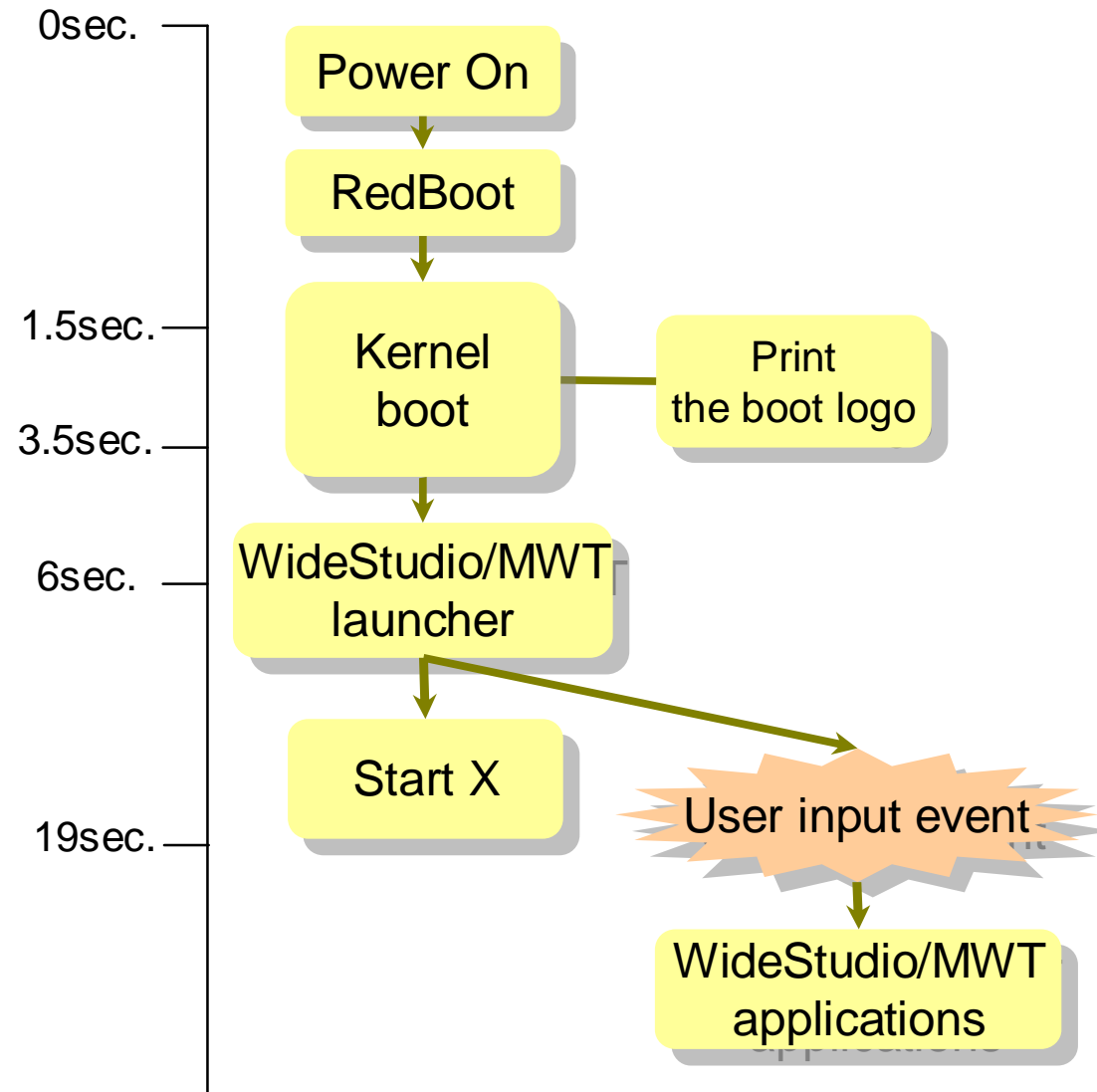
- Verifying the chart.

## Boot chart for (none) (Tue Nov 30 00:00:11 UTC 1999)

uname: Linux 2.6.12 #1 Tue May 23 20:41:03 JST 2006 frv  
release: .u Visual  
CPU: (0)  
kernel options: console=ttyS0,115200 mem=128M ip=none root=/dev/mtdblock1 rootfstyp  
time: 0:11



# Step4: Evaluation(2)

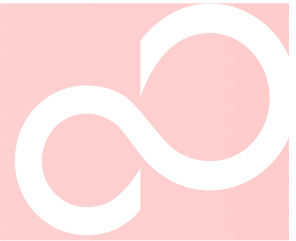


# Reducing Startup time - Summary



- Leave things until later as much as possible.
  - Installing kernel modules.
  - Starting middlewares.
- Separate RootFS into a minimal fundamental one and the other.
  - Only mount the fundamental one in the early stage.
  - Leave mounting the other until later.
- Optimize the init procedures.
  - Operations not needed for an application launcher should be left until later.
- Use light weight GUI environment.

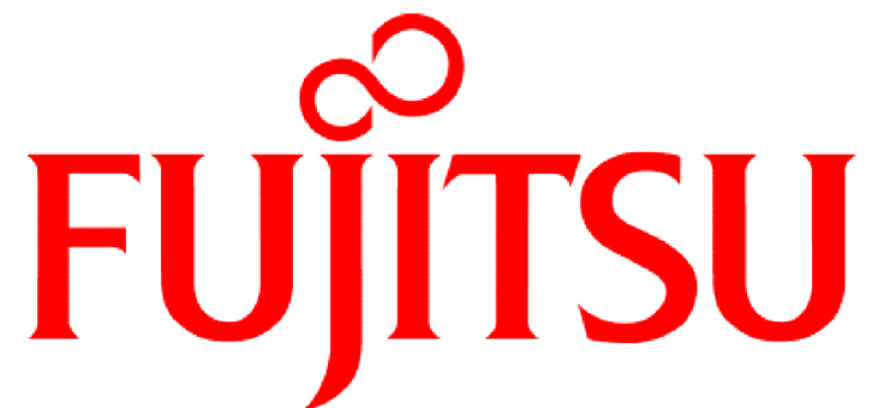
# Topics of Bootchart



- embootchart
  - Developed by Matthew Klahn, Motorola.
  - The presentation has been made in last ELC.

[http://tree.celinuxforum.org/CelfPubWiki/ELC2006Presentations?  
action=AttachFile&do=get&target=VisualizingResUsageDuringBoot.pdf](http://tree.celinuxforum.org/CelfPubWiki/ELC2006Presentations?action=AttachFile&do=get&target=VisualizingResUsageDuringBoot.pdf)

- Reduce overheads of Bootchart and improve accuracy of measurements.



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